Written Assignment 4

Introduction To Computer Systems (Carnegie Mellon University)

15-213: Introduction to Computer Systems
Written Assignment 4

This written homework covers machine programming, the memory hierarchy, and locality.

Directions

Complete the question(s) on the following pages with single paragraph answers. These questions are not meant to be particularly long! Once you are done, submit this assignment on Canvas.

Below is an example question and answer.

Q: Please describe the benefit of 2s-complement signed integers versus other approaches (such as 1s-complement or signed-magnitude).

A: For both 1s-complement and signed-magnitude representations of signed integers, we end up representing both -0 and +0, which gets inconvenient when the computer wants to test for a zero result. Additionally, in both of these representations, implementing addition/subtraction is complicated. With 2s-complement, the hardware for addition / subtraction is the same for both signed and unsigned inputs.

Grading

Each assignment will be graded in two parts:

1. Does this work indicate any effort? (e.g. it's not copied from a homework for another class or from the book)
2. Three peers will provide short, constructive feedback.

Due Date

This assignment is due on Wednesday, October 7th by 11:59 PM EST. Remember to convert this time to the timezone you currently reside in.

Question 1

Explain two strategies for thwarting buffer overflow attacks. Compare their vulnerabilities -- can you describe an attack that one strategy may be susceptible to but the other could successfully prevent?

Question 2

What features of a storage device determine where it fits into the memory hierarchy? What are the benefits of organizing memory/storage devices as a memory hierarchy, and what properties of hardware and software do these benefits rely on?